

# PVE Testing

- Assurance that the OBD system is working properly in-use and meets the requirements of the regulation
- Testing done close to the start of engine production to identify potential major problems that need to be fixed as early as possible
- Verification of the following required:
  - Standardized Requirements
  - Monitoring Requirements
  - In-Use Monitoring Performance



# Verification of Standardized Requirements

- Purpose: To verify that every engine and vehicle variant properly communicates within ISO and SAE specifications to a generic scan tool
- Test vehicle selection:
  - Test one production vehicle from every unique engine family and vehicle variant
    - Representative testing for vehicles with identical communication-related software and calibration
    - Maximum of 10 variants per engine family tested



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# Verification of Standardized Requirements (cont'd)

- Testing Requirements:
  - Use standardized engineering-type test equipment
    - ARB approval of testing equipment required
    - Standardized verification software/standardized hardware for test equipment/vehicle interface
    - Software initiates test and generates report
    - Testing takes about 20 minutes per vehicle
  - Testing to be done within either three months of the start of engine production or one month of the start of vehicle production, whichever is later



# Verification of Monitoring Requirements

- Purpose: To verify that each and every OBD monitor can detect a malfunction, store a fault code, and illuminate the MIL
- Test engine/vehicle selection:
  - Test 2 to 6 production engines and vehicles based on number of demonstration test engines:
    - 1 demo engine => test 1 engine and 1 vehicle
    - 2 demo engines => test 2 engines and 2 vehicles
    - 3 demo engines => test 3 engines and 3 vehicles
  - Test results to be submitted within six months of the start of engine production



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# Verification of Monitoring Requirements (cont'd)

- Testing Requirements:
  - Single fault testing
  - No emissions tests or threshold components
  - No dyno required (but can be used if you want)
  - Install malfunctioning component/simulate malfunction (e.g., bad component, breakout box)
  - Operate engine/vehicle in monitoring conditions until MIL is on and fault code is stored
  - Testing typically takes 4 weeks to complete



# Verification of In-Use Monitoring Performance

- Purpose: To verify that the OBD monitors are running frequently in-use
- Test Vehicle Selection:
  - Group vehicle variants/engine families together where in-use monitoring performance is expected to be similar
  - Submit test plan, which includes groupings, number of vehicles, and where data will be collected, for ARB approval



# Verification of In-Use Monitoring Performance (cont'd)

- Testing Requirements:
  - Collect rate-based data to be representative of every grouping
    - Usually requires data from a minimum of 15 or more vehicles within a grouping
  - Data accessible via a generic scan tool
    - Usually collected from a small sample of dealers when vehicles are in for service/maintenance
  - Data results to be submitted within either six months after the start of engine production or vehicle introduction into commerce, whichever is later



# In-Use Enforcement

- Intermediate In-use Compliance Standards
  - 2010-2015 MY: For emission threshold-based monitors, OBD “non-compliance” only considered when emissions exceed 2.0 times the malfunction criteria (e.g., 3.0 x std for malfunction criteria of 1.5 x std) without MIL illumination
  - 2010-2012 MY: additional relief provided by limiting testing to only the FTP or ESC—whichever the manufacturer determined at the time of certification to be the most stringent



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# In-Use Enforcement (cont'd)

- No proposed detailed OBD enforcement test procedures at this time
  - Need more experience with types of testing, number of vehicles, etc.
  - Likely will adopt regulation prior to 2010 model year
- However, liability for OBD noncompliances still exists for the engine manufacturer
- Engine manufacturers liable for recall and/or fines under general ARB authority (HSC section 43105)

